The Parker Ranch installation in Hawaii

Webinar on Door Retrofits for Open Medium-Temperature Refrigerated Display Cases

February 14, 2013

Introduction

The purpose of this webinar is to provide BBA Retailer Energy Alliance members and other interested parties with the opportunity to learn about door retrofits for open medium-temperature refrigerated display cases.

- DOE has organized this webinar session based on previous input from members, and as a follow-up to the publication of its *Guide for the Retrofitting of Open Refrigerated Display Cases with Doors*.
- Representatives from the supplier and end-user communities will be speaking today:
  - From REMIS AMERICA, LLC: Erin Dolan, Sales and Marketing Coordinator, and Rick Waldron, Product Manager.
  - From Target Corporation: Paul Anderson, Refrigeration Engineering Group Manager, and KC Kolstad, Senior Mechanical Engineer.
- Each presenter will give a roughly 30-minute presentation, followed by about 15 minutes for open question and answer.

The material presented in this webinar is based upon the expertise and interpretations of the presenters and their employers. It does not constitute a view on behalf of the U.S. Department of Energy.

Presentation 1 – REMIS AMERICA

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Open Refrigerated Display Case Retrofits

Erin Dolan – Sales and Marketing Coordinator
Rick Waldron – Product Manager

REMIS AMERICA, LLC.

REMIS AMERICA, LLC

Savings Potential

- 164 feet open multi deck covered with doors:
  - 64,683 kWh saved annually
  - 83,638 pounds CO_2 saved annually
- For 155 stores:
  - 10,025,803 kWh saved annually
  - 12,963,859 pounds CO_2 saved annually

**These stores utilize night curtains approximately 7 hours per day*

OEM Published Data

- **Manufacturer A:**
  - Multi deck Dairy case with doors: 256 BTUH/FT @ +28 evaporator temp
  - Multi deck open dairy case: 1079 BTUH/FT @ + 28 evaporator temp
  - 823 BTUH/FT saved.
- **Manufacturer B:**
  - Multi deck case with doors: 242 BTUH/FT @ +32 evaporator temp
  - Multi deck open dairy case: 1358 BTUH/FT @ + 26 evaporator temp
  - 1116 BTUH/FT saved.
- **Manufacturer C:**
  - Multi deck case with doors: 268 BTUH/FT @ +34 evaporator temp
  - Multi deck open dairy case: 1398 BTUH/FT @ +24 evaporator temp
  - 995 or 1130 BTUH/FT saved.

Example ROI

Ohio Retailer

RemiSafe Hinged Doors for Multi Deck Cases

with LED lights

Planned Linear feet of Case to be enclosed with Remis Doors	**104**
KWH per LF per Day at 41° F	**3.83**
KWH Daily Consumption	**398.32**
KWH Per Year	**145,386.80**
Total Annual Electrical Cost	**$17,446.42**
Adjusted KWH used per Year after Installation	**27,478.11**
Adjusted Total Annual Electrical Cost after Installation	**$3,297.37**
Total Dollar Savings in electricity	**$14,149.04**
Percent KWH Savings	**81%**

ROI in years without rebates or incentives	**2.30**

Based on KWH at	**$0.1200**

Incentive amount from utility (estimated)*	**$8,136.25**

***Note: there is no guarantee that a utility rebate will be applicable.**

ROI in years with incentive included	**1.73**

Retrofit Benefits

Glass Door Retrofits

- Save Energy
- Reduce Carbon Footprint
- Maintain Merchandise Visibility
- Improve Product Quality
- Consistent Case Temperatures
- Reduce Food Spoilage
- Warmer Aisles
- Longer Shopper Dwell Times

European Experience

- REMIS GmbH
  - 35+ Years Refrigeration Technology experience
  - Over 10,000 Retail Stores with REMIS Products in Europe

Typical Applications

- Intial retrofits were:
  - Dairy
  - Beverage
  - Beer
- Secondary retrofits:
  - Deli
  - Packaged Produce
  - Fresh Meat

Application Exceptions

- per customer:
  - Produce cases with misting systems not recommended
  - Bulk produce cases when mixed with packaged produce
    - Varies by retailer
- could retrofit, but may require new ends (replace contoured ends with box ends) or extensions to the case top:
  - 3 or 4 deck meat
  - 1, 3 or 4 deck produce
- A site visit might be required to confirm if the second category can be retrofitted or not
- We cannot retrofit any low temperature cases

Installation Process

- **NIGHT ONE:** 36’ lunch meat and 40’ dairy
  - Removal of existing lighting and any nose bumpers.
  - Installation of bottom nose tins.
  - Installation of frames.
  - Installation of upper mounting brackets and upper interior close off profiles.
  - Installation of canopy lighting and associated wiring.
  - Testing of lighting.
  - Hanging, aligning and adjusting of glass doors.
  - Replace canopies and any removed nose bumpers.
  - Remove painter’s cloths. Clean up
- **Night two:** 80’ beer
  - Removal of existing lighting and any nose bumpers.
  - Installation of bottom nose tins.
  - Installation of frames.
  - Installation of upper mounting brackets and upper interior close off profiles.
  - Installation of canopy lighting and associated wiring.
  - Testing of all lighting.
  - Hanging, aligning and adjusting of glass doors.
  - Replacement of canopies and any removed nose bumpers.
  - Remove painter’s cloths. Clean up
- **Night Three:** 12’ salad, 12’ dairy and 44’ dairy
  - Removal of existing lighting and any nose bumpers
  - Installation of bottom nose tins.
  - Installation of frames.
  - Installation of upper mounting brackets and upper interior mounting profiles.
  - Installation of canopy lighting and associated wiring.
  - Testing of all lighting.
  - Hanging, aligning and adjusting of all glass doors.
  - Replacement of canopies and any removed nose bumpers.
  - Remove painter’s cloths. Clean up
  - Clean store work areas thoroughly and remove any and all refuse from premises
  - **Final inspection**: Walk floor with store management; provide instruction in operation of glass doors and maintenance/cleaning processes.
  - Management sign-off and satisfaction survey along with warranty information


-PACKED CHEESE
SARGENTO


DanActive
Trix
Yoplait
Kids
DHA
Fat Free


SQUEEZED!


PRODUCTS AVAILAB
NEW JELL-O
RICE PUDDING
REFASHIONED!
70
69¢


EXIT
POINTS


Dean's
Cottage Cheese
Daisy


JELL-O
Daisy
Light
CREAM
DanActive
Dannon
RoGURT

Issues Affecting Retrofits

- Fascia
- Corner Cases
- Rear Load Dairy
- Columns
- Cases that require top extended (i.e. meat)

 PAY MORE? COMPARE AND SAVE
Ultra Saver
COMPARE and SAVE
BARTLES & JAYMES
4 PK COOLERS
$4.99
You Save: $3.00
Ultra Saver
COMPARE and SAVE
HEINEKEN BEER
12 PK BOTTLES
$12.99
You Save: $3.50
COLD BEER NOW AVAILABLE!!
Ultra Saver
MILLER BEER
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STELLA ARTOIS
SAMUEL ADAMS BOSTON LAGER
Lite
Modelo
CHILL
Miller 64
BUD LIGHT
Busch
Corona Extra
SMIRNOFF


Low prices are cool.
Low prices are cool.
deli meats
$4.79
$3.49
$3.99
$2.99
Deli Fresh

Recommended Adjustments

for multi deck cases after doors are added:

- Warm the cases 4 to 5 degrees.
- Adjust the defrost setting from 4 to 6 per day to 1 or 2 per day.
- Adjust the superheat setting on adjustable expansion valves or replace non adjustable expansion valves with ones that have a smaller orifice size.

for island cases after covers are added:

- Warm the cases 5 to 7 degrees.
- Adjust the defrost setting from 1 or 2 per day to 2 or 3 per week.
- Adjust the superheat setting on adjustable expansion valves or replace non adjustable expansion valves with ones that have a smaller orifice size.
- Reduce the air flow to no more than 80 FPM by changing or modifying the fan blade.

Photos


the best Service
the cultured advantage.
DESSERTS
YOGURT
NOVELTIES


Organic Produce
organic
Grown with your health and our environment in mind
Organic Produce
organic


Organic Produce
organic
Grown with your health and our environment in mind
Organic Produce
organic


buy any 3 or more get 10% off


artificial preservatives, flavors or colors, conveniently packed.
new
great for sharing
they can trust


let's grill
buy more & save


Cerdo
Res


CHOCOSTICKS

Questions for the presenter?

Open Refrigerated Display Case Retrofits

Paul Anderson – Refrigeration Engineering Group Manager
KC Kolstad – Senior Mechanical Engineer

Target Corporation

Medium Temperature Doors

DOE Webinar

Medium Temperature Doors

Phase 1…

- Plan
- Document and Measure Existing Conditions

⚠ WARNING

Inability to Plan and Document Existing Conditions May Negate Any Energy Savings and May Increase Maintenance and Repair Expenses

Medium Temperature Doors

Installed Doors on Minneapolis and Los Angeles Area Stores

- Length of Door Installation Ranged from 60-100 feet of Open Multi-Deck per Store
- Covered All of the Fresh Categories

Medium Temperature Doors - Categories

Before

After

Medium Temperature Doors – Full View

Installation

Worked Over Night

- 50% complete on 1st Night
- 100% complete after the 2nd Night
- Anticipate Unforeseen Conditions

Installation

What Changed:

- Case Setpoints
- Defrost Frequency
- Case Superheat (Expansion Valves Re-Adjusted)
- Lighting

What Didn't Change:

- Suction Risers
- Compressor Oil Level
- Medium Temperature Compressor Capacity
- Expansion Valves
- HVAC Set Points

HVAC Setpoints

Tested Higher Market Dewpoints

Refrigerant Charge

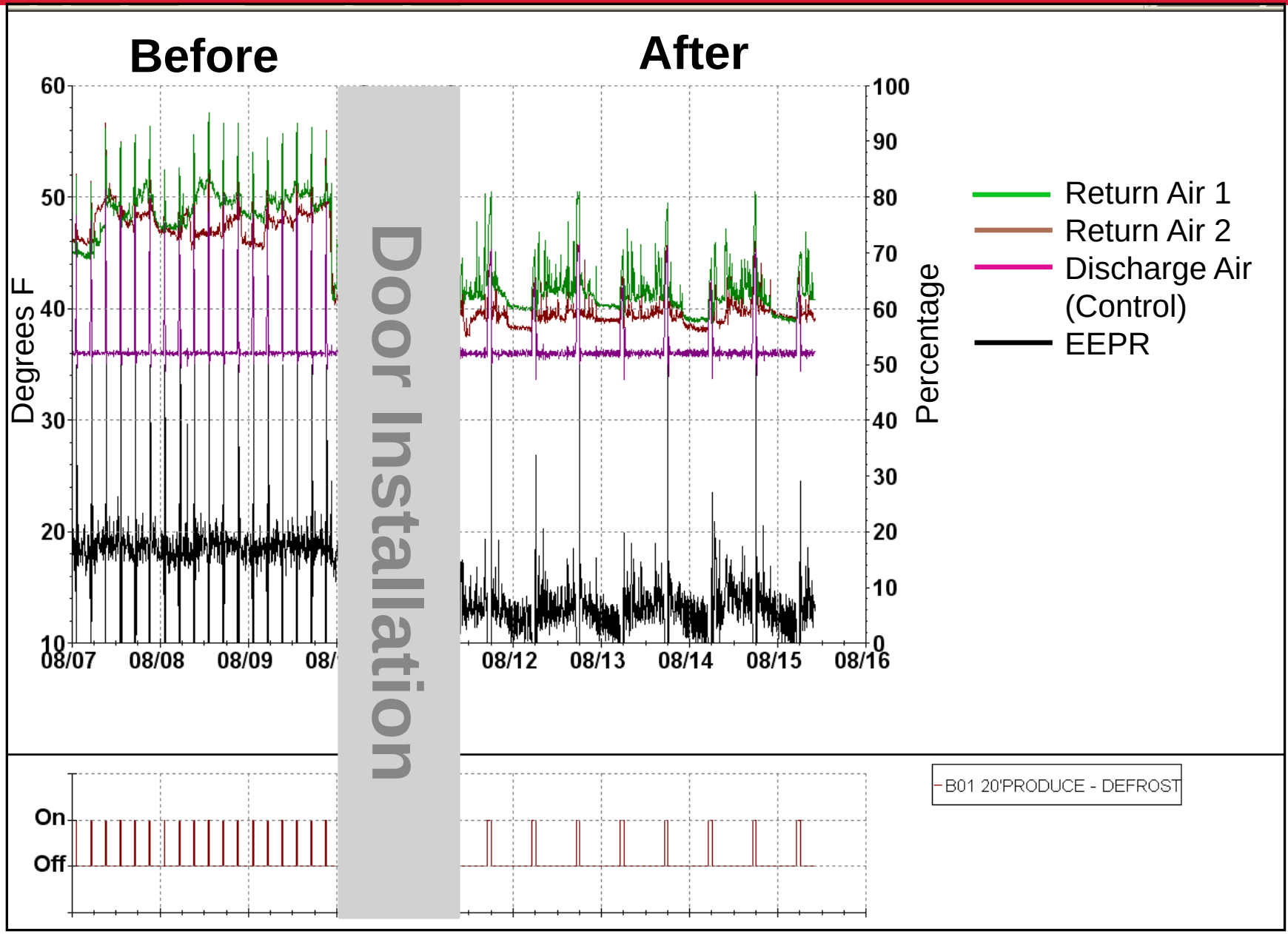
Remember…

- Refrigerant Charge is Contained In:
    1. Condenser
    2. Receiver
    3. And Liquid Lines

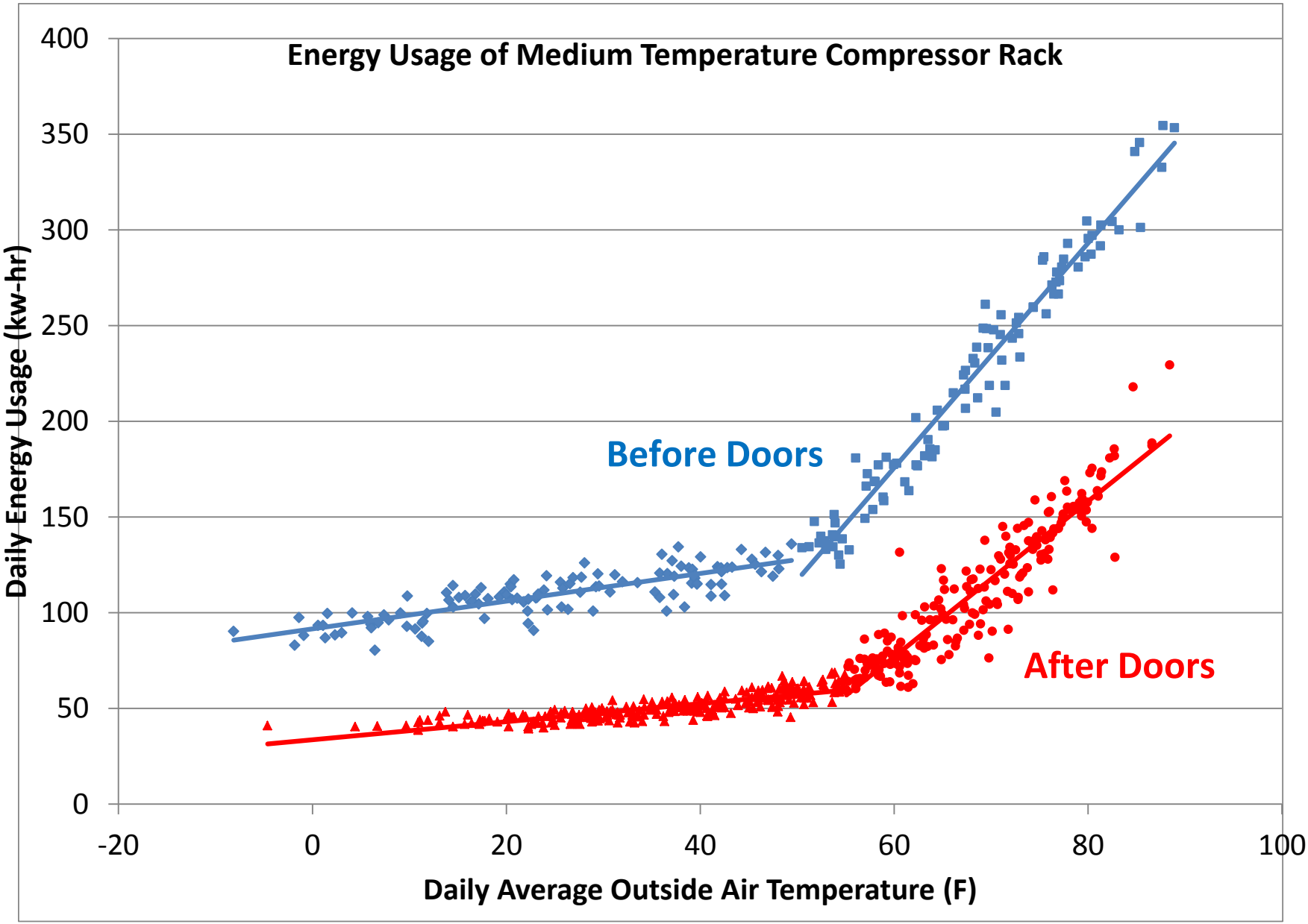
- Retro-fitting doors on an Existing Store will not change any of these components and therefore will NOT change the refrigerant charge in the system

- There are opportunities in new construction for enhanced efficiencies

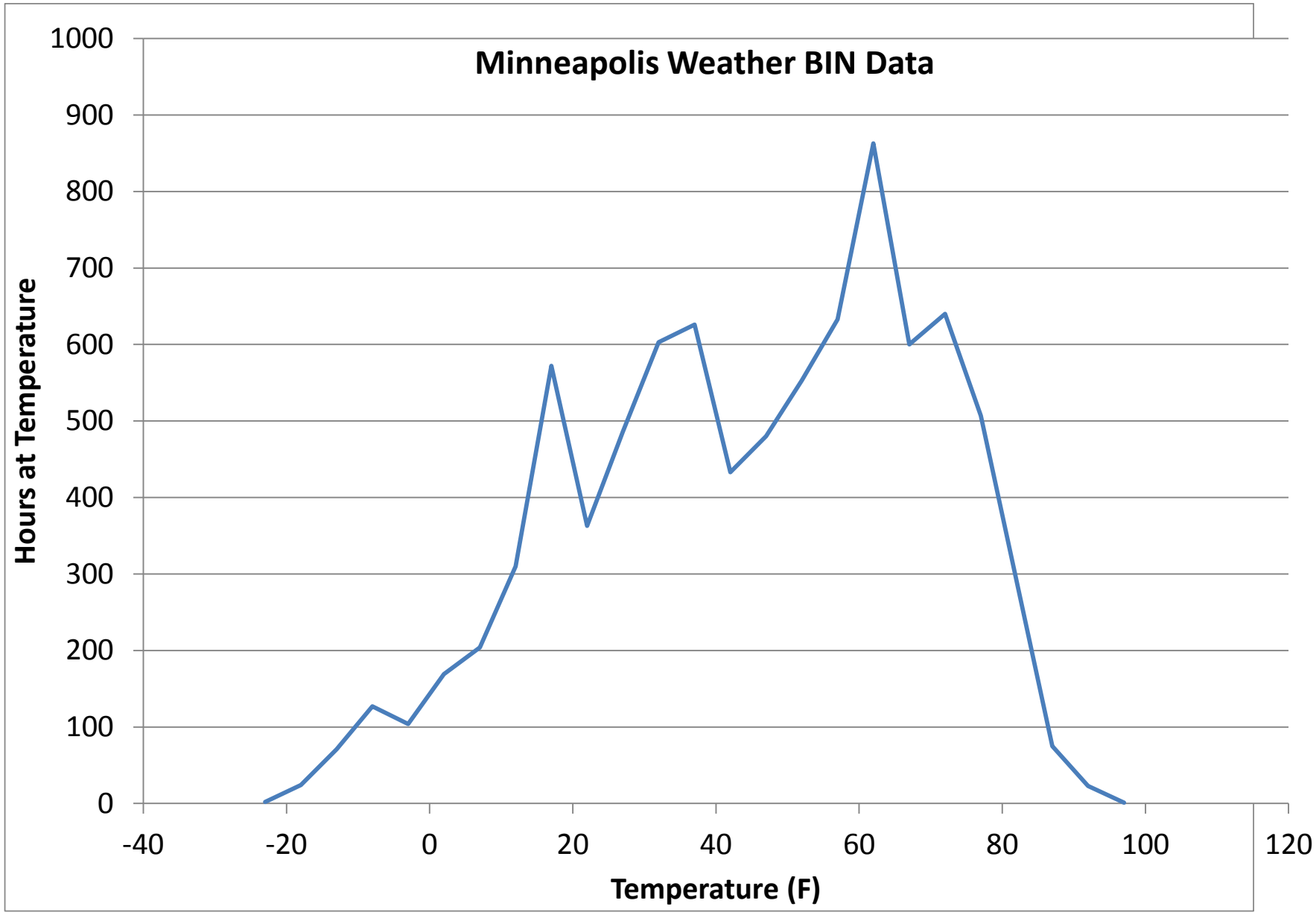
System Performance



Energy – 60 Feet Open Multi-Deck



Energy – 60 Feet Open Multi-Deck

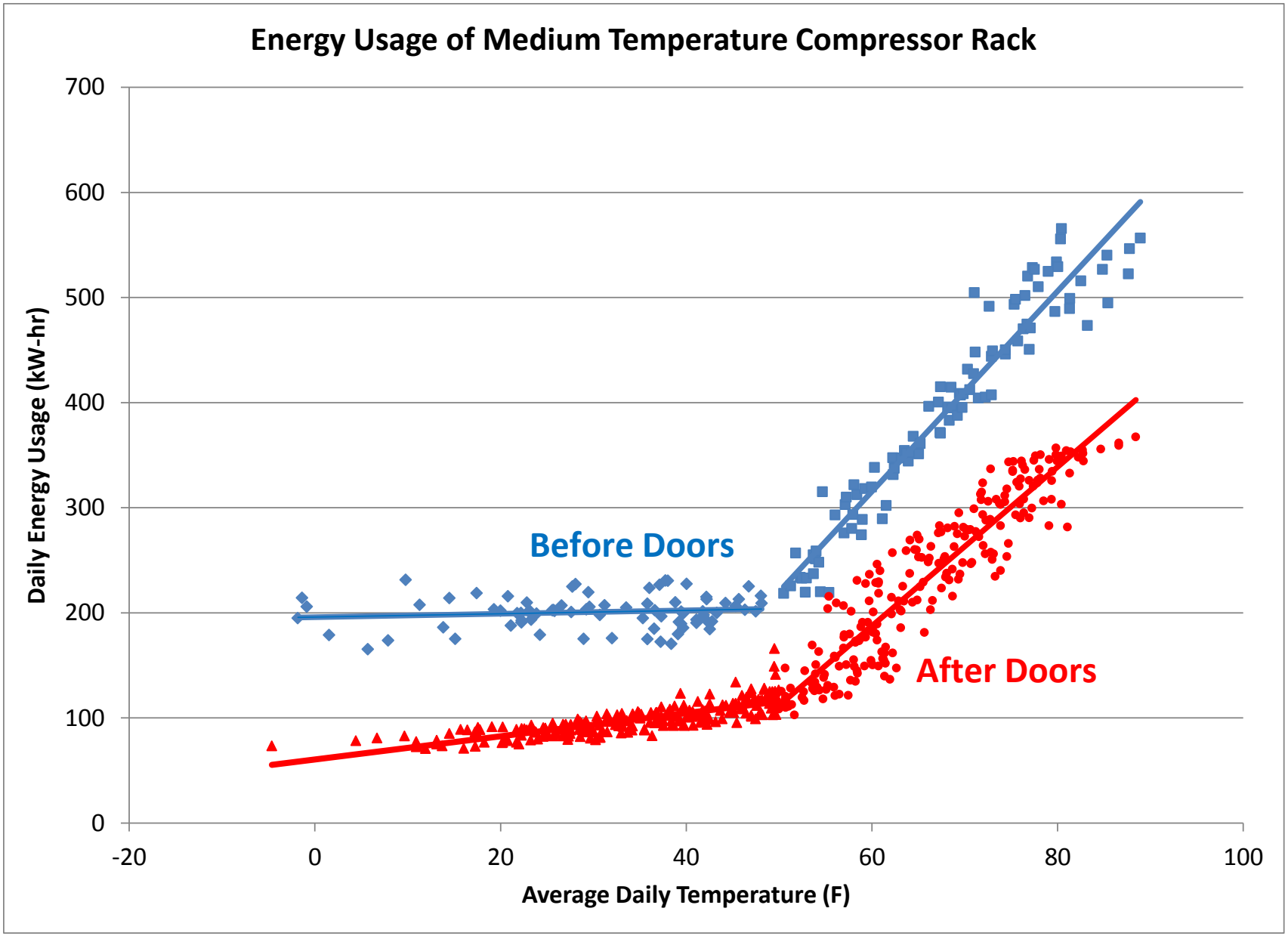


Energy – 60 Feet Open Multi-Deck

Minneapolis BIN Data		Trendline Equations	
Temperature	Hours at Temperature	Before Doors (kW-hr)	After Doors (kW-hr)
97	1	16	9
92	23	348	198
87	75	1044	583
82	291	3695	2017
77	507	5819	3085
72	640	6563	3353
67	600	5420	2636
62	863	6741	3062
57	633	4171	1710
52	553	2968	1341
47	480	2511	1117
42	433	2200	965
37	626	3086	1334
32	603	2882	1225
27	486	2249	940
22	363	1625	666
17	572	2475	994
12	310	1295	508
7	204	821	314
2	169	655	244
-3	104	387	140
-8	127	454	158
-13	71	243	81
-18	24	79	25
-23	2	6	2
	Sum	**57,752**	**26,708**
	Difference	**31,044**	

54% Energy Reduction

Energy – 100 Feet Open Multi-Deck



Energy – 100 Feet Open Multi-Deck

Minneapolis BIN Data		Trendline Equations	
Temperature	Hours at Temperature	Before Doors (kW-hr)	After Doors (kW-hr)
97	1	28	19
92	23	595	412
87	75	1790	1224
82	291	6367	4292
77	507	10086	6678
72	640	11462	7421
67	600	9555	6011
62	863	12030	7285
57	633	7568	4346
52	553	4707	2925
47	480	4069	2247
42	433	3657	1927
37	626	5266	2643
32	603	5052	2407
27	486	4056	1828
22	363	3017	1282
17	572	4735	1889
12	310	2556	953
7	204	1675	580
2	169	1382	442
-3	104	847	248
-8	127	1030	274
-13	71	574	137
-18	24	193	41
-23	2	16	3
	Sum	**102,311**	**57,513**
	Difference	**44,798**	

44% Energy Reduction

Target's Metrics for Total Cost of Ownership

Metrics	Status	Highlights
Uptime (Guest Impact)		Zero documented demerchandising events Positive and Negative feedback from Guest
Capital Investment		Higher equipment and installation expense Utility Rebates may be available
Maintenance and Repair		Maintenance and Repair costs projected to be approximately $1k/yr./store over a ten year period
Energy (kW*hr)		Approximately $4k/year cost savings (refrigeration only)
Sustainability		Net carbon reduction of CO_{2e}/store/yr.
Store Operations		Approximately $700/year incremental cost to stock and clean doors

Conclusions

- Significant Reduction in Energy
- Other Key Performance Indicators Negatively Impacted
- Refrigerant Charge Reduction on New Systems Only
- Consider as an Option for Refrigerant Retro-fits
- Realize that you may not be able to change HVAC Settings

Questions for the presenter?

Conclusions

Additional items:

- Ideas for future webinars?
- Webinar topic suggestions can be emailed to Collin.Weber@Navigant.com

Thank you for your time and participation.